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# *Balanopsammia wirtzi*, A NEW GENUS AND SPECIES OF CORAL (Anthozoa: Scleractinia: Dendrophylliidae) FROM THE CAPE VERDE ISLANDS: A COMPARATIVE STUDY WITH THE MEDITERRANEAN *Cladopsammia rolandi*

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## RESUMEN

Se describe un nuevo género y especie de escleractinia perteneciente a la familia Dendrophylliidae, denominada *Balanopsammia wirtzi*, de las islas de Cabo Verde. Esta nueva especie puede crecer de forma solitaria o formar colonias con los cálices densamente dispuestos. Presenta los septos organizados siguiendo el Plan de Portualés, manteniéndose dicha disposición desde la etapa juvenil hasta la adulta. Una primera impresión puede llevar a clasificarla dentro del género *Balanophyllia,* pero la capacidad de formar colonias nos indica que debemos explorar otras posibilidades. Esta nueva especie ha permanecido confundida al menos desde la década de los sesenta con la especie mediterránea *Balanophyllia italica*. *B. wirtzi* se ha localizado en las islas Sao Tiago y Sal pero debe estar presente también a lo largo del resto de las islas del archipiélago caboverdiano. Vive desde los charcos intermareales bien renovados, pero es más común en la zona submareal somera incrustando pequeñas grietas y cavidades hasta 10 m de profundidad; es especialmente conspicuo en paredes verticales bien sombreadas y parcialmente cubiertas por algas calcáreas incrustantes. A efectos comparativos, se aporta un estudio completo del cnidoma y datos sobre la distribución ecológica de *Cladopsammia rolandi* en las mediterráneas Islas Eolias, estudiando una población grande localizada en el techo de una cueva.

**Palabras Clave:** *Balanopsammia wirtzi,* escleractinia Dendrophylliidae, nuevo género y especie, islas de Cabo Verde, *Cladopsammia rolandi*, Mar Mediterráneo, cnidoma.

## ABSTRACT

A new genus and species of scleractinia belonging to Dendrophylliidae family recorded from Cape Verde is described in this paper. *Balanopsammia wirtzi* develop Portualés Plan in their septa from the juvenile to the adult stage and can grow solitary or forming colonies with

densely calyces arrangement as well. In a first sight the species can be tentatively included into the genus *Balanophyllia,* but its colonial way of growing advices us to explore other possibilities. In the Cape Verde Archipelago, the new species had been previously confused with the mediterranean *Balanophyllia italica*. We recorded *B. wirtzi* from Sao Tiago ad Sal although its presence in the other islands is expected but not confirmed. It is intertidal in pools with good water movements and especially shallow waters species down till 10 m and widely spread in crevices and small cavities. It is conspicuous in upper part of vertical walls, particularly in shadow places among calcareous algae. The study of a cave in Eolie Islands at the Mediterranean make possible to include some data on a huge population of *Cladopsammia rolandi* growing on a ruff cave through the time as well as to compare the morphology and the cnidae of both Denrophylliidae studied.

**Key words:** *Balanopsammia wirtzi*, scleractinia Dendrophylliidae, new genus and species, Cape Verde Islands, *Cladopsammia rolandi*, Mediterranean Sea, cnidae.

## 1. INTRODUCTION

The study on the material of a scleractinia from Cape Verde Islands developed the presence of a new Dendrophylliidae species that does not belong to the current known living genera of this family. These species can grow as a solitary coral and also forming colonies of moderate size, with densely arranged polyps and present the Pourtáles Plan in their septa from the juvenile to the adult stage. General appearance of the new taxa recall to the other genera *Balanophyllia*, *Leptosammia*, *Cladopsammia* and *Rhizopsammia* although remarkably differences are noticed.

In Cairns taxonomical and phylogenetical points of view (see CAIRNS [1], [2], [3]) the skill to produce colonies is important to state differences between some solitary genera (*Balanophyllia*, *Leptopsammia*) and others forming colonies (*Cladopsammia*, *Rhizopsammia*). *Balanophyllia*'s characteristic is to be solitary and the maintenance of the Pourtáles Plan from the juvenile to the adult; meanwhile be solitary lacking the Pourtáles Plan in adults is *Leptopsammia* attribute. Other perspectives on *Leptosammia* allow the possibility to form colonial aggregates (see Zibrowius, 1980; Veron, 1986). Meanwhile the genera *Cladopsammia* and *Rhizopsammia* include species with septa junctions (Pourtáles Plan) but with different colonial development: budding from a basal coenosteum with calyces densely arranged in *Cladopsammia* or budding from a stolon and the calyces separately arranged in *Rhizopsammia*. These features are also assumed recently (see CAIRNS & KITAHARA [4]).

Showing a global perspective of our present species, we find out that it is a solitary to colonial species with a clear presence of "Pourtalès Plan" from the juvenile to the adult stage. The description of a new species of *Balanophyllia* was considered as a first tentative although it was rejected as it would have been the first colonial species belonging to this genus. In the other hand, it could be defined a new genus on the base of its colonial way of living but it would not be satisfactory at all if we do not focus the attention within the anatomy and other morphological characters. However, *sensu* S. D. Cairns (com. in litt.) our present colonial form of scleractinia may fit into the genus *Cladopsammia* but our new species from Cape Verde shows remarkably differences (colony structure and way of growing, habitat and cnidom) in relation to *Cladopsammia*. The genus *Cladopsammia* comprise six species, five of them distributed in deep water habitats (see ROBERTS *et al.*[13]) and one of them *C. rolandi* inhabit dark environments from 20 to 50 m in the Mediterranean Sea. The species *C.*

*rolandi* has been exclusively recorded from the Mediterranean Sea but its occurrence is scarce. ZIBROWIUS [17] noted the presence of the species in Algeria, Tunisia, Malta, Salerno Gulf, Naples Gulf, Tarente Gulf and the East of Sicily. Our new data from Eolian Islands are interesting in terms of the Mediterranean distribution, in addition this record develop the ancient presence of the species in the ruff of a cave habitat. In the present paper morphological and cnidae comparison between the new taxa and *C. rolandi* are included.

The new species from Cabo Verde Islands is spread from intertidal and shallow waters till 10 m deep. Attending to all the differences (colony structure and way of growing, habitat and cnidom) between the *Cladopsammia rolandi* and the present capverdian specimens we erect a new genus to accommodate the species from Cape Verde islands.

The material assigned to *Balanophyllia italica* (=*Balanophyllia europaea*), a very different Mediterranean endemic species, from Cape Verde archipelago in 1966 by Chevalier (see CHEVALIER [5]; ZIBROWIUS [17]; and MORRI & BIANCHI [11]) had been possibly erroneously identification of the present new genus and species described along this paper. MORRI *et al.*, [12] identified the capverdian material as *Balanophyllia* sp.

## 2. MATERIAL AND METHODS

The specimens of the present new genus and species come from different locations within the Cape Verde Islands in West Africa. The new taxon was observed in different locations in Sao Tiago Island (Tarrafal Bay, Caleta do San Martinho and Caleta Mosquito) and also in several spots at Sal Island (Murdeira Bay, Tres Cuevas, Puntiña, Palmeira Bay and Pedra Lume). Samples of *C. rolandi* were collected in several points at Eolie Islands, north of Sicily. The samples were collected using scuba diving equipment, were fixed with 5-10% formaldehyde and later stored in 70% alcohol or in dry conditions in the collections of the "Museo de Ciencias Naturales de Tenerife (TFMCBM)" and the "Museo del Mar de Ceuta (MMC)". Several colonies and polyps were prepared removing the soft tissue in order to study the general morphology and the anatomical features of the skeleton by means of a stereo dissecting microscope. Nematocysts were examined with a light microscope equipped with a Nomarski differential interference contrast optic system. The classification and terminology of nematocysts follows that of SCHMIDT [14], as adapted by HARTOG [8] and HARTOG *et al.* [9]. The surveys of the cnidom are summarized in tables in which the means and ranges of length and width of nematocysts are included. The following codes are used in the tables: vc: very common; c: common; rc: rather common; uc: uncommon; r: rare.

## 3. SYSTEMATICS

Order SCLERACTINIA
Suborder DENDROPHYLLIINA
Family DENDROPHYLLIIDAE

Genus ***Balanopsammia*** gen. nov.

**Diagnosis**: Solitary to small colonies formed mainly by extra-tentacular budding. Extra-calicinal budding arrange from the corallum wall and never from laminar expansion. In the colonies

the corallum epitheca are joined and do not overhang from the colony, also the corallum epitheca is weakly costate. Septa follow Poutalès Plan; pali absent and columella present variable development, from scarce trabeculae structure to a wide porous feature.

Remarks. As a difference with *Cladopsammia* and *Rhizopsammia*, both with well separated enlarged calyces, the new genus *Balanopsammia* develop colonies with short densely packet calyces. The cnidome present a general appearance close to *Balanophyllia* but also the presence of several categories of penicilli D in the pharynx make close the genus to *Cladopsammia rolandi* and *Astroides calycularis*.

**Type species:** *Balanopsammia wirtzi* n. sp.

**Etimology:** The term *Balanopsammia* is related to the long confusion in the identification of the species type as a *Balanophyllia*.

***Balanopsammia wirtzi*** n. sp.
(Figs. 1-7, Tab. 1)

**Material**.- Coll. MMC-007: shallow water, 5 m, near a colony of *Zoanthus* sp., five specimens, three solitary attached to the stones and two joined and also attached to rocky substrate. All of them presented orange colour. Bahia do Palmeira, Sal, Cabo Verde, O. Ocaña leg., 18/08/2002, preserved in formaline; **paratype**. Coll. MMC-008: Intertidal in pools, forming small colonies attached to rocky substrate; Bahia do Palmeira, Sal, Cabo Verde, O. Ocaña leg., 18/08/2002, ten specimens in a small colony preserved in formaline; orange colour; **paratype**. Coll. MMC-009: Intertidal in slope, one enlarged colony of 12 polyps. Polyps were mainly pink coloured. Punta Preta, Tarrafal, Sao Tiago Island, Cabo Verde, O. Ocaña leg., 14/08/2002. Soft tissues were removed, colonies are dry preserved; **holotype**. Coll. MMC-010: Intertidal in slope, one colony of 15 polyps. Polyps were mainly pink coloured. Punta Preta, Tarrafal, Sao Tiago Island, Cabo Verde, O. Ocaña leg., 14/08/2002. Soft tissues were removed; colonies are dry preserved, **paratype**. Coll.MMC-011: Intertidal in slope, solitary polyp of pink colour. Punta Preta, Tarrafal, Sao Tiago Island, Cabo Verde, O. Ocaña leg., 14/08/2002. Soft tissues were removed, dry preserved, **paratype**. Coll.MMC-012: Shallow waters (1-5 m) in rocky substrate, solitary polyp of orange colour, King Fish, Tarrafal, Sao Tiago Island, Cabo Verde, O. Ocaña leg., 15/08/2002, dry small specimen with the soft tissues not removed, **paratype**. Coll. MMC-013: Shallow waters in rocky substrate, solitary polyp of orange colour, King Fish, Tarrafal, Sao Tiago Island, Cabo Verde, O. Ocaña leg., 15/08/2002, dry big specimen with the soft tissues not removed, **paratype**. Coll. MMC-014: Shallow waters in rocky substrate, enlarged colony of 9 polyps and two tiny juveniles, orange colour, King Fish, Tarrafal, Sao Tiago Island, Cabo Verde, O. Ocaña leg., 15/08/2002, dry specimens with the soft tissues not removed, **paratype**. Coll. MMC-015: Shallow waters in rocky substrate, colony of 8 polyps, orange colour, King Fish, Tarrafal, Sao Tiago Island, Cabo Verde, O. Ocaña leg., 15/08/2002, dry specimens with the soft tissues not removed, **paratype**. Coll MMC-016: Shallow waters in rocky substrate, colony of 7 polyps of orange colour, King Fish, Tarrafal, Sao Tiago Island, Cabo Verde, O. Ocaña leg., 15/08/2002, dry specimens with the soft tissues not removed, **paratype**. Coll. MMC-017: Shallow waters in rocky substrate, colony of 10 polyps of orange colour, King Fish, Tarrafal, Sao Tiago Island, Cabo Verde, O. Ocaña leg., 15/08/2002, dry specimens with the soft tissues not removed, **paratype**. Coll. MMC-018: Shallow waters in rocky substrate, colony of 13 polyps but two of them smaller, orange colour, King Fish, Tarrafal, Sao Tiago Island, Cabo Verde, O. Ocaña leg., 15/08/2002, dry specimens with the soft tissues not removed, **paratype**.

The others five compact colonies and also a solitary polyp conform six **paratypes**. Coll. TFMCBM/11313; CN/00193: Intertidal, Caleta do San Martinho (a colony of 9 polyps) and Caleta Mosquito (2 joined specimens), Sao Tiago Island, Cabo Verde, A. Brito leg., 12/1986, soft tissues were removed, colonies are dry preserved **paratype**. Coll. TFMCBM/11314; CN/00194: Shallow water, 2 solitary specimens, 10 m, on rocky substrate, Bahía do Murdeira, Sal island, Cabo Verde, A. Brito leg, 9/1986, soft tissues were removed, specimens are dry preserved **paratype**.

**Description**. Pink, reddish and orange are the colour observed in the specimens of this new species. The colonies are phaceloids, forming group of some polyps (15 polyps is the maximum number of polyps observed per colony) Corallum timpanoid, or also turbinate to trochoid, elliptical, some solitary specimens can be more elongate than the big ones (see figs. 4 and 5). The largest specimen reaches 15 mm x 10 mm in calicular diameter and 25 mm in height, normally the specimens show a short corallum with a rude appearance. The smallest reaches 5 mm x 5 mm in calicular diameter and 5 mm tall. Commonly grouped in small colonies of 5 to 15 closely packed corallites, isolated specimens and couples (see colour fig.7) are also frequent. Lower part of corallum epitheca covered with encrusting organisms, rest of the corallum epitheca widely porous and weakly costate. Costae are very narrow and commonly inconspicuous and separately narrow furrow. They bear granules, more obviously accumulated in the crest (upper part). Medium to big specimens present a broad calicular diameter and septa hexamerally arranged in 5 cycles, the last incomplete (in small specimens with narrow calicular diameter were observed 4 cycles). S4 and S5 are joined following the Pourtalés Plan (S3 and S4 in small specimens). S1 and S2 are equal in size reaching the columella although in the low zone become wider giving the impression of forming a paliform lobe. Due to the theca conformation the septa may appear winding along their way till the columella. We counted from 70 to 96 septa in different specimens. S1-2 equal in size and slightly exsert. Due to the junction of the septa (following the Pourtalés Plan) is rather difficult to follow the septa cycles properly. Nevertheless, all the specimens analyzed present the expected structure in agreement with the general arrangement of the cycles in the group. In the big specimens we find out twelve groups of fused septa between the S1 and S2, it is possible to follow clearly that each group bear seven fused septa. So between the S1 and S2 there are 84 fused septa plus S1 and S2 an amount of 96. There is not pali struture. We observed fused septa from small specimens till the big ones. The fossa is deep and may present a medium developing porous columella, forming a similar trabeculae structure than the rest of the corallum epitheca. Columella may be also reduced to a slightly line in the centre of the fossa.

Cnidome. Coll. MMC-007 paratype: shallow water, 5 m, near *Zoanthus* sp., five specimens, three solitary attached to the stones and two joined and also attached to rock. All of them presented orange colour. Bahía do Palmeira, Sal, Cabo Verde, O. Ocaña leg., 18/08/2002, preserved in 5% formaline mixed in sea water.

**Etymology**. The name is dedicated to Dr. Peter Wirtz who has been doing a huge sampling efforts in the behalf of the East Atlantic marine fauna knowledge.

**Distribution and Ecology**. The species has been recorded in various locations in the islands of Sao Tiago and Sal (Cape Verde archipelago); its presence in the other islands is expected but not confirmed. The species can be moderately exposed to the light but normally incrusting crevices and small cavities. It is also present in intertidal areas: upper part of vertical walls,

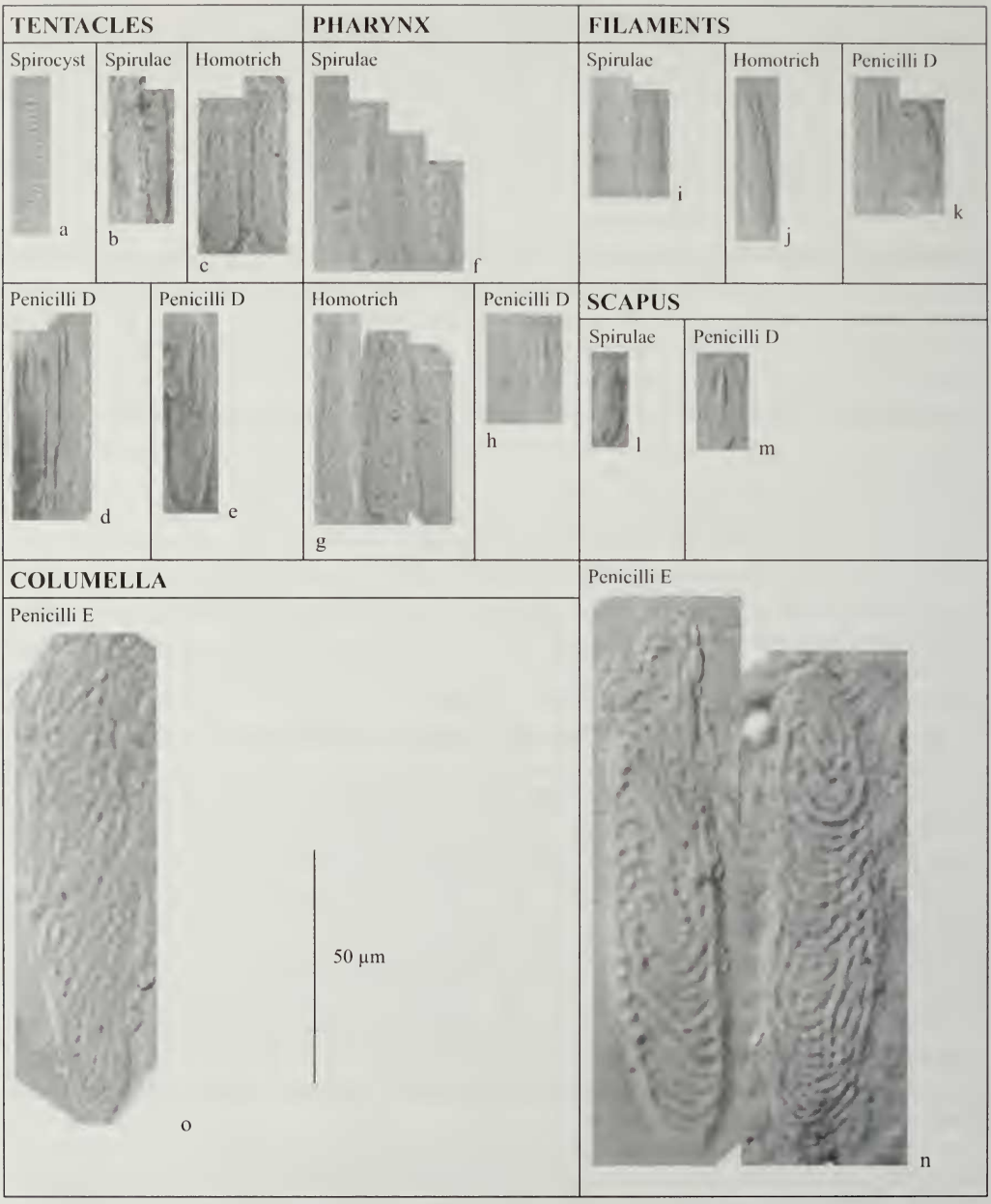



**Figure 1.-** Pictorial survey of the cnidom.

particularly in shadow places among calcareous algae and partially protected by their calcareous expansions. Also in pools with good water movement and renovation can be observed close to *Palythoa canariensis* y *Bunodosoma* sp. In shallow water environments (1-10 m) it was observed in light exposed flat platform with algae, hydroids, barnacles, sea urchins and fire coral (see figure 7, infralitoral left); in this environment it is possible to observe the new species together with the actiniaria *Cereus* sp.

| Organ | Nematocyst type | Mean and range (in parentheses) of length and width of nematocyst capsules in µ | N | Frequency |
|---|---|---|---|---|
| **Scapus** | Spirulae (l) | 16,33 (15-18) x 5,5 (5-6) | 3 | Rare |
| | Penicilli D (m) | 20 (17-23) x 7 (5,2-8) | 10 | Common |
| | Penicilli E (n) | 104,8 (95-114) x 24 (23,2-25,3) | 5 | Uncommon |
| **Tentacles** | Spirulae (b) | 38,4 (27,6-49,5) x 5,3 (3,6-6) | 10 | Common |
| | Homotrichs (c) | 33 (28-36) x 6 (5,2-7) | 10 | Common |
| | Penicilli D (d) | 40 (38-44) x 6 (5,6-6) | 10 | Very Common |
| | Penicilli D (e) | 42 x 10 (9,2-10) | 2 | Rare |
| | Spirocysts (a) | (20-35) x (2,5-4) | 10 | Very Common |
| **Pharynx** | Spirulae (f) | 32,2 (26-40) x 5 (2,5-6) | 15 | Very Common |
| | Homotrichs (g) | 39,14 (32,8-44) x 6,5 (6-8) | 10 | Very Common |
| | Penicilli D (h) | 20,6 (18-22) x 6 (5-7,5) | 10 | Common |
| **Filaments** | Spirulae (i) | 28,6 (26-40) x 6 (5-6,5) | 5 | Uncommon |
| | Homotrichs (j) | 30 (26-34) x 6 (5,2-6) | 5 | Rather Common |
| | Penicilli D (k) | 37,2 ( 24-46) x 8,2 (7-10) | 10 | Common |
| **Columella** | Penicilli E (o) | 90 (72-104) x 21,6 (19-24) | 5 | Uncommon |

**Table I.-** *Balanopsammia wirtzi.* Survey of the cnidom of one colony from Palmeira Bay, intertidal, 18/08/02, Sal Island (Cape Verde Islands).

We find some macro-fauna in association to the colonies of the new species: such as barnacles, sedentary polychaeta with calcareous tubes and a conspicuous bivalve forming holes incrusted inside the coral skeleton.

## 4. DISCUSSION

**Taxonomical remarks**. *Balanophyllia italica* (=*Balanophyllia europaea*) was recorded from Cape Verde in 1966 by Chevalier (see CHEVALIER [5] and ZIBROWIUS [17]). Chevalier's confusion was possibly motivated by the similar shape that isolated specimens of *B. europaea* may have with our new species. We conclude that Chevalier did not realize about this new species when he observed the material sent to him and collected by Cadenat in 1950 at Sal Island.

The skeleton structure shows the fused septa persistence from the juvenile till the adult. This character joined to the colonial way of living observed in the species often makes difficult it merging into the genera *Balanophyllia* or *Leptosammia*. The confluence of these two characters points the genus *Cladopsammia* as a possible placement for this new species from Cape Verde. Comparing the general appearance and their skeletons both the shallow water *Cladopsammia rolandi* and our present new species *Balanosammia wirtzi* are not really very similar at all. They do not present the same way of growing, in *Cladopsammia rolandi* the polyps form a cluster of polyps with the columns isolated from each other (Figs. 9 and 10), also the corallum epitheca is heavily costate. Meanwhile, in the new genus and species the polyps have the corallum epitheca joined and do not overhanging from the colony (Figs. 2 and 3), the

corallum epitheca is weakly costate. According to this, *C. rolandi* and the new species are very different in shape but also in habitat. *C. rolandi* inhabit caves and cornices or ruffs from 10 to 30 m deep but *B. wirtzi* is typical from intertidal to 10 m deep and never has been recorded in caves. From the point of view of the reproduction the species are also different as in *C. rolandi* the most common asexual reproduction pattern is the extra-calicinal budding from a laminar expansion (similar to what happen in the genus *Rhizopsammia*) meanwhile in *B. wirtzi* extra-calicinal budding from the calyce's wall is the most common reproduction: extra-calicinal budding arrange from the corallum wall and never from laminar expansion.

Nevertheless, the cnidae characters will offer another point of view as well as open other taxonomical possibilities. According to TERRÓN-SIGLER & LÓPEZ-GONZÁLEZ [15] the cnidae can be an useful taxonomic character in order to distinguish species belonging to the same genus, at least, their paper prove that such hypothesis can be applicable to shallow waters *Balanophyllia* species, *B. regia* and *B. europaea*, from North-eastern Atlantic and the Mediterranean. Comparing *B. regia* and *B. europaea* with other Dendrophylliidae as *Astroides calycularis* and *C. rolandi* and *B. wirtzi* we can realize the existence of groups into this family from the point of view of the cnidom characters. One group present several categories of penicilli D in the pharynx (*A. calycularis*, *C. rolandi* and *B. wirtzi*) meanwhile other group (*B. regia* and *B. europaea*) do not present such categories. Generally *A. calycularis* (Ocaña in prep.) and *C. rolandi* (see figure 8 and table II) present much more categories meanwhile the new taxa shows nearness to *Balanophyllia*.

Subsequently, *C. rolandi* and *B. wirtzi* show other cnidae characters very different between them. The absence or practically absence (maybe too scarce to find out along this study) of spirulae (b-mastigophores) in the tissues of *C. rolandi* and the presence of big special penicilli D (with a long shaft) in tentacles and scapus of the same species makes the most relevant characteristics to distinguish it from *B. wirtzi*. Attending to all the differences (colony structure and way of growing, habitat and cnidom) between these two shallow water species we can assure the present new species should be placed into a different genus.

**Figure 2.-** Close up on the holotype (MMC-009) showing septa and columella details.

**Figure 3.-** General appearance of the holotype, MMC-009.

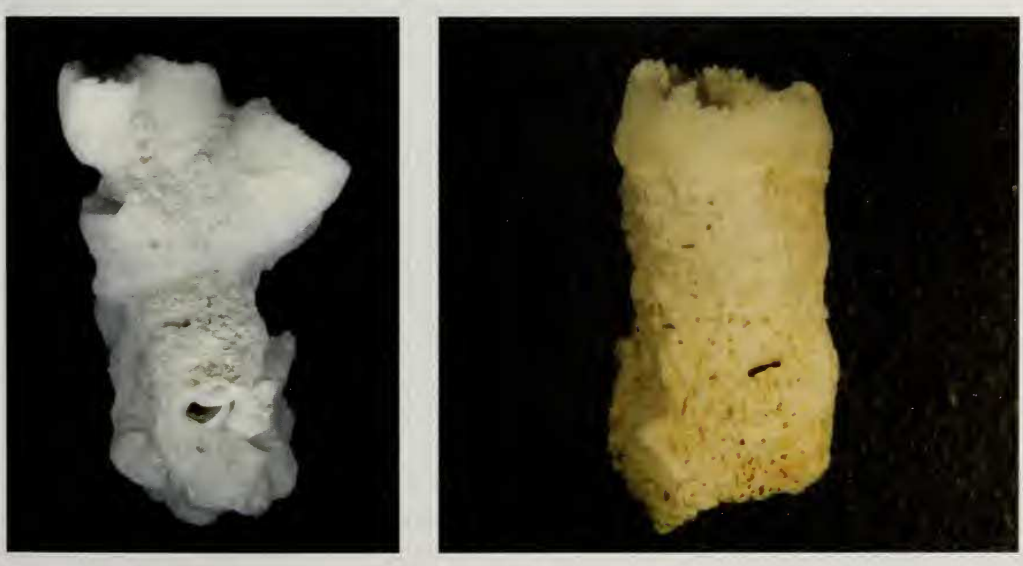


**Figure 4.-** Some paratypes appearance: left MMC-010; right TFMCBM/11314, CN/00194.

**Figure 5.-** Shape and columella detaisl of the specimen including in the paratype TFMCBM/11314, CN/00194.

**Distribution and Ecology remarks**. Possibly the water temperature is a key factor in order to understand the larval settlement (see ROBERTS *et al.* [13]). According to these authors, the larval duration in the water column is exponentially negative relationship between length of larval duration and water temperature. Judging the scarce dispersion of the species in the Cape Verde islands, the most settlement of the larvae should be close to the adults although we do not know about the planktonic larval duration. Studying the colour images we can assure good larvae recruitment near the adults and a dubious long distant dispersion, meanwhile the asexual reproduction play the common role of increase the colony size once the larvae settle in the substratum. Extra-calicinal budding seems the most common way to reproduce the polyps in order to form the colony; small buds are commonly developing from the corallum walls, the process is easy to observe in the image of the habitus (see figure 6), intra-calicinal budding may occurs also although the only evidence is the observation of several close couples with the same size (see figure 7).

**Figure 6.-** Extra-calicinal budding observed in MMC-010.

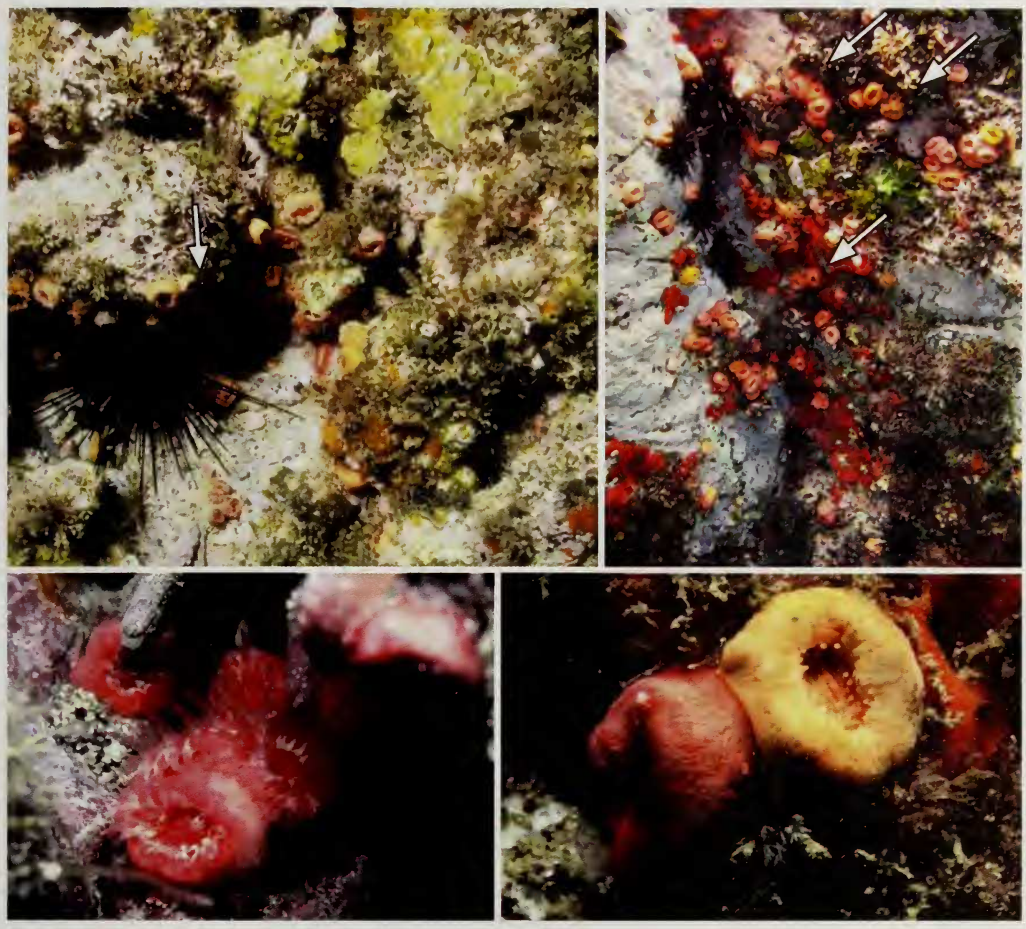
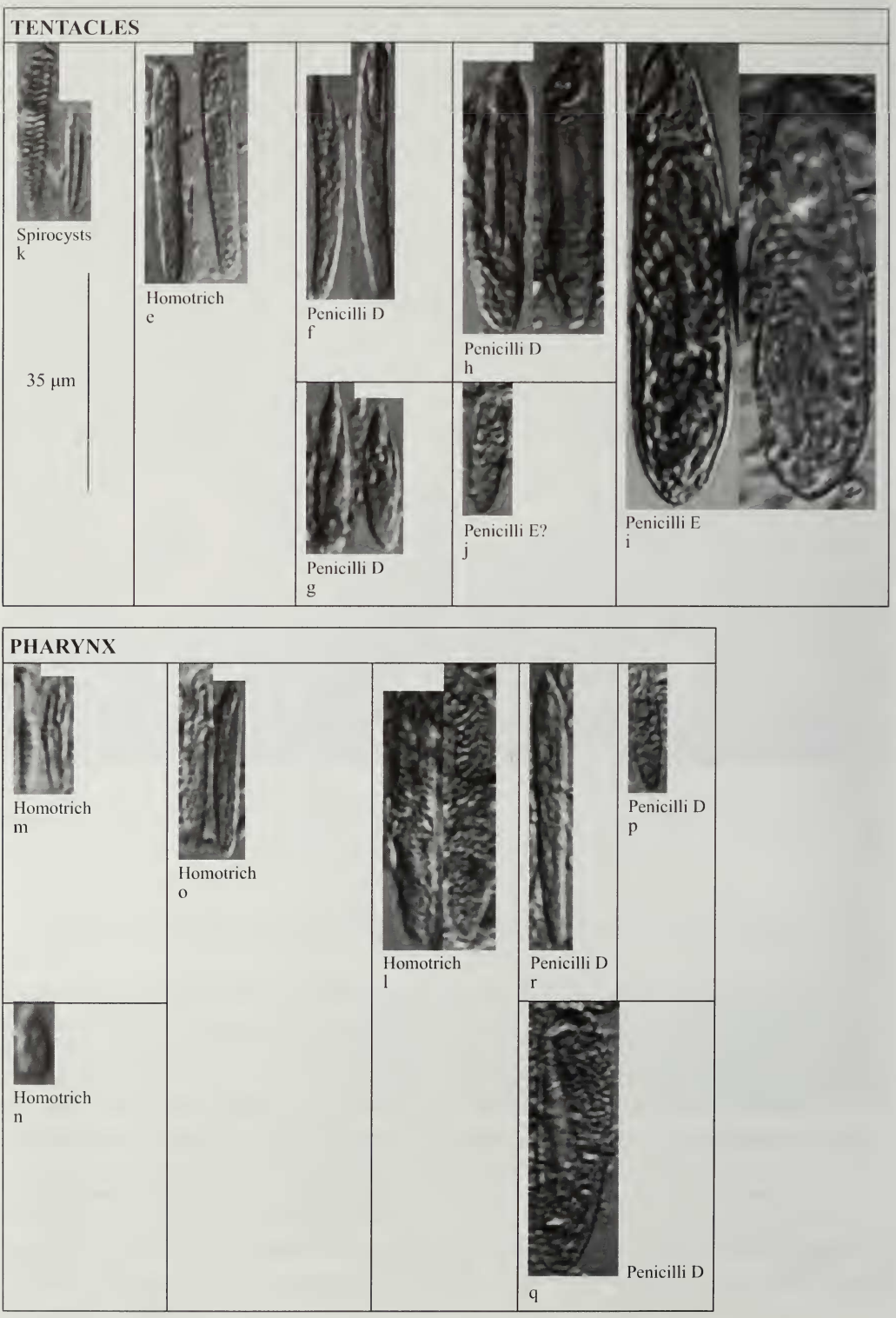


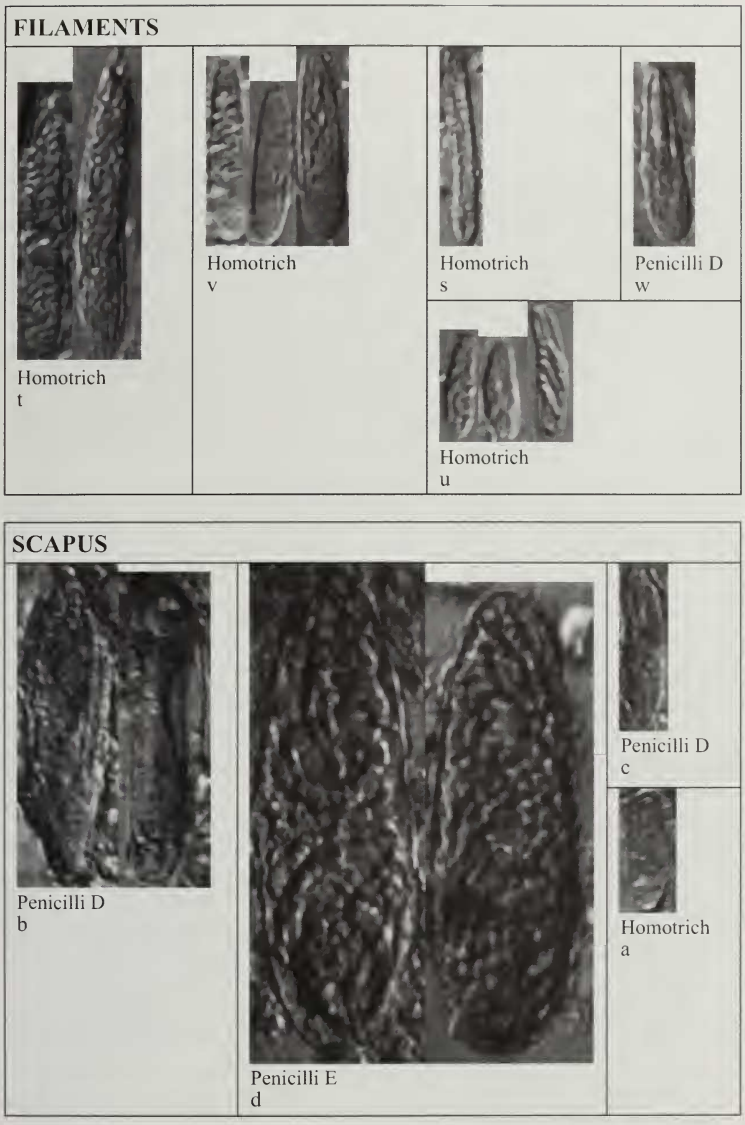
**Figure 7.-** Habitats: infralitoral left; intertidal right and close up colour images of *Balanosammia wirtzi*. White arrows indicate extracalicinal asexual reproduction; down right may indicate intracalicinal asexual reproduction.

## 5. ABOUT THE SPECIES *Cladopsammia rolandi* IN THE EOLIE ISLANDS

*C. rolandi* is known from some localities in East Algeria, Tunisia, Malta and South of Italy. This distribution pattern seems to be restricted to some locations in central Mediterranean. Our present record confirms this geographical settlement preference as well as the abundance along the Eolie Archipelago. We find the species in Lipari, Vulcano, Salina and Strombolichio, and it surely should be present in the others. Colonies were very common along the vertical walls of the islands incrusting from 10 till 50 m depth. Normally small polyps groups were observed inside crevices or under slopes, but also growing directly on the vertical walls. In these last sites the competition with algae is strong and the polyps partially colonized by them, filamentous and green algae are the most important ones (figure 9 up right). It is common to find also *C. rolandi* close to calcareous algae and also the green algae *Codium* spp., *Palmophyllum crassum* and *Halimeda tuna*. The association to sponges (*Anchinoe*, *Myxilla* and *Clathrina*) and other scleractinia (*Caryophillia inornata*, *Polycyathus*

**Figure 8.-** Pictorial survey of the cnidome.






*muellerae*, *Leptosammia pruvoti* and even *Astroides calycularis*, about 10-15 m depth) is also a common feature of this species in this Mediterranean site. According to ZIBROWIUS [17], the bryozoans should be incrusting the basal part of the corallum (figures 9 and 10).

The presence of a huge population of *C. rolandi* growing on a ruff cave shows an ancient accumulation of this species through the time. The high thickness observed in the coral accumulation proves the oldness of this biological structure. As the live part of this species occurs in the terminal part of the corallum, other marine organisms occupy the rest of the skeleton. It is possible that this macro bio-structure should be the result of a long period of reproduction and permanence process in this habitat. Marine organism, mainly sponges and briozoa more characteristic in the dark parts of the caves (see HARMELIN [6],[7] and MARTÍ *et al.* [10]), were colonizing the basal part of the colonies motivating new grows that increase the thickness in the ruff of the cave through the years. Nevertheless, the occurrence of lots of

dead skeleton substrate no colonized by the scleractinia, areas of low coral density, may suggest the recuperation of the coral population after a mortality event.

As far as we know the population of this cave in the Vulcano Island is the most important site of *C. rolandi* in terms of number of polyps and colonies.

The observations of the colonies along the islands find out two different colonial way of growing: the basal plate form when the polyps are grouped forming a flat colony more extended and less ramified; and the ramified colonies when polyps grow making stratified groups (figure 9). Both growing should be due to different ecological strategies of occupying the substrate against the algae and other invertebrates.

Extra-calicinal budding is the most common reproduction pathway from a laminar expansion, and intra-calicinal division have been only observed scarcely in the basal plate form. According to ZIBROWIUS [17] the larvae use the dead corallum calices to settle (figure 10). In July, when we were working in the islands, the species was producing larvae and we took the opportunity to observe a big concentration of the diminute white larvae in a cave (figure 11).

| Organ | Nematocyst type | Mean and range (in parentheses) of length and width of nematocyst capsules in µ | N | Frequency |
|---|---|---|---|---|
| **Scapus** | Homotrich (a) | 19.97 (15-22) x 5.6 (5-6) | 15 | Rather Common |
| | Penicilli D (b) | 45.3 (40-47) x 12 (10-15) | 15 | Rather Common |
| | Penicilli D (c) | 21.6 (20-25) x 5.3 (5-6) | 3 | Rare |
| | Penicilli E (d) | 68.78 (62-76) x 22.3 (20-25) | 25 | Common |
| **Tentacles** | Homotrich (e) | 39.90 (32-50) x 4.3 (4-5) | 25 | Common |
| | Penicilli D (f) | 39.8 (35-45) x 4 (3.5-4.5) | 20 | Common |
| | Penicilli D (g) | 21.5 (20-25) x 5.5 (5-6) | 4 | Rare |
| | Penicilli D (h) | 45.5 (40-48) x 8.6 (7-10) | 10 | Uncommon |
| | Penicilli E (i) | 70.4 (63-80) x 17.7 (16-20) | 15 | Rather common |
| | Penicilli E | 45 x 10 | 1 | Rare |
| | Penicilli E ?(j) | 22 (17-26) x 4.8 (4-5) | 10 | Uncommon |
| | Spirocysts (k) | (15-30) x (2-4) | | Very Common |
| **Pharynx** | Homotrich (l) | 40.8 (35-50) x 6.2 (5-7) | 20 | Rather Common |
| | Homotrich (m) | 16.5 (16-17) x 3 | 2 | Rare |
| | Homotrich (n) | 16 (11-20) x 4.5 (4-5) | 5 | Rare |
| | Homotrich (o) | 27.3 (20-32) x 3 (3-3.5) | 15 | Rather Common |
| | Penicilli D (p) | 20 x 5 | 1 | Rare |
| | Penicilli D (q) | 44.6 (41-48) x 9.6 (6-12) | 10 | Uncommon |
| | Penicilli D (r) | 41.7 (35-45) x 4.2 (3.5-5) | 25 | Common |
| **Filaments** | Homotrich (s) | 25.8 (21-30) x 3 | 15 | Rather Common |
| | Homotrich (t) | 41 (32-50) x 6 (5-7) | 15 | Rather Common |
| | Homotrich (u) | 15.7 (12-20) x 4 (3-5) | 20 | Common |
| | Homotrich (v) | 25.7 (20-30) x 5.1 (5-6) | 20 | Common |
| | Penicilli D ?(w) | 25.2 (20-27) x 5.3 (5-8) | 20 | Common |

**Table II.-** *Cladopsammia rolandi.* Survey of the cnidom of one colony from Vulcano Island, 25 m, 10/07/05, Italy. MMC-009.

Remarks. Some homotrichs, difficult to observe inside the capsules, from the pharynx may be in fact spirulae. Small homotrichs from pharynx may be more abundant but inconspicuous. Penicilli D from filaments may belong to penicilli A category. Small penicilli E from tentacles could belong to homotrich group.

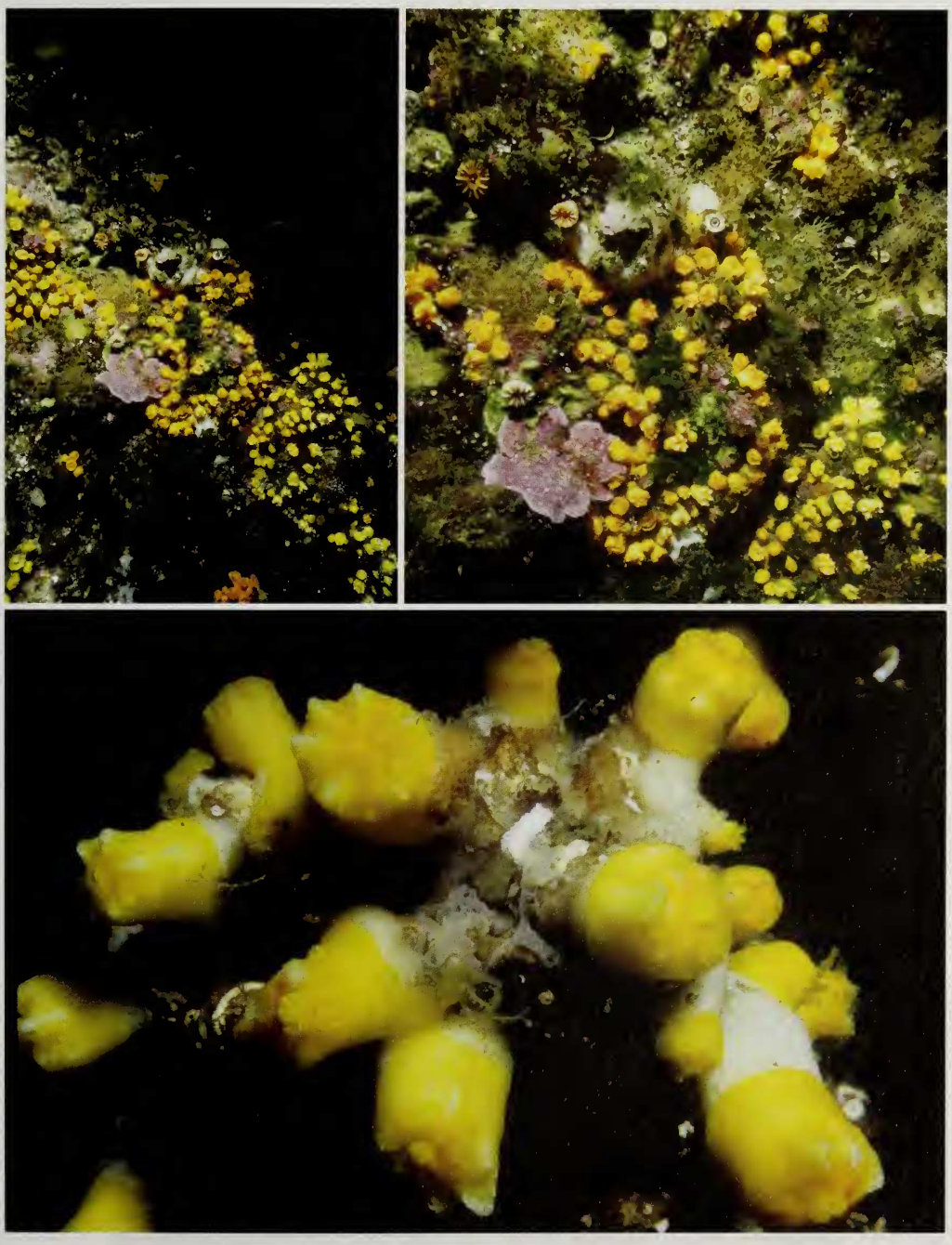


**Figure 9.-** Up two images of the basal plate form, up right a close up showing the competition with the algae. Below shows a magnify image of the ramified colonies when polyps grow making stratified groups.

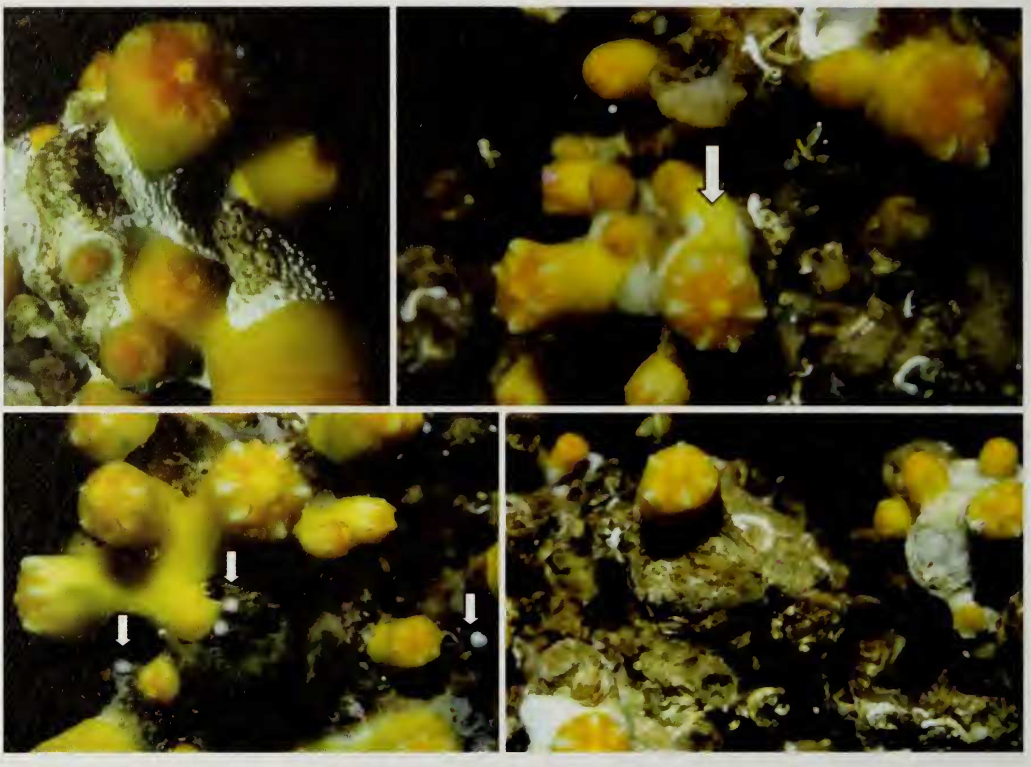


**Figure 10.-** Up left shows the bryozoa encrusting the basal part of the corallites and also the small specimen growing from a larvae settle in an old calyx; up right present the laminar expansion; down left shows the white larvae settle close the big specimens; down right, new specimens growing on old death colonies.

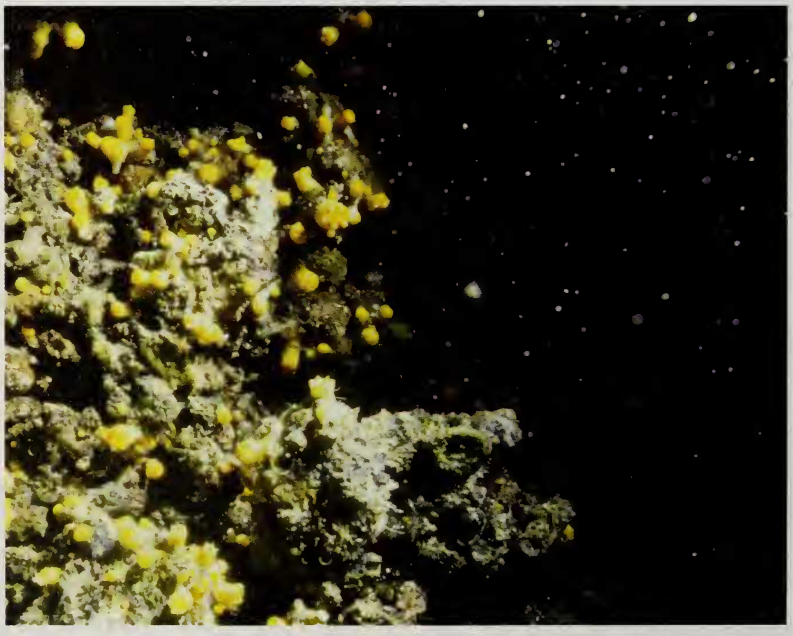


**Figure 11.-** Concentration of larvae (white tiny rounded) in a cavern on July.

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